FORM-PTO-1390 (Rev. 12-29-99) **TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371** U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 027566-028 U.S APPLICATION NO. (If known, see 37 C F.R 1.5) Unassigned 09/831281

INTERNATIONAL APPLICATION NO. PCT/EP99/08591	INTERNATIONAL FILING DATE 9 November 1999	PRIORITY DATE CLAIMED 10 November 1998

TITLE OF INVENTION
SECURITY IN TELECOMMUNICATIONS NETWORK GATEWAYS

APPLICANT(S) FOR DO/EO/US
Leslie GRAF, Ian RYTINA, and Mark HOLLIS

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).

4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))

    a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☒ has been transmitted by the International Bureau.

    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))

    a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☐ have been transmitted by the International Bureau.

    c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.

    d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.

    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☒ Other items or information:

    Unexecuted Declaration, Preliminary Examination Report, PCT Demand and PCT Request

(01/01)

U.S. APPLICATION NO (If known)(see 37 C.F.R 1.52)) Unassigned **09/831281**	INTERNATIONAL APPLICATION NO PCT/EP 99/08591	ATTORNEY'S DOCKET NUMBER 027566-028

	CALCULATIONS	PTO USE ONLY

17. ☒ The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,000.00 (960)

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $860.00 (970)

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $710.00 (958)

International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) $690.00 (956)

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00 (962)

ENTER APPROPRIATE BASIC FEE AMOUNT = $ 860.00

Surcharge of **$130.00 (154)** for furnishing the oath or declaration later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(e)). $ ---

Claims	Number Filed	Number Extra	Rate	
Total Claims	9 -20 =	0	X$18.00 (966)	$ - 0 -
Independent Claims	2 -3 =	0	X$80.00 (964)	$ - 0 -
Multiple dependent claim(s) (if applicable)			+ $270.00 (968)	$ ---

TOTAL OF ABOVE CALCULATIONS = $ 860.00

Reduction for 1/2 for filing by small entity, if applicable (see below). $ ---

SUBTOTAL = $ 860.00

Processing fee of **$130.00 (156)** for furnishing the English translation later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(f)).   + $ ---

TOTAL NATIONAL FEE = $ 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 (581)** per property + $ ---

TOTAL FEES ENCLOSED = $ 860.00

	Amount to be: refunded	$
	charged	$

a. ☐ Small entity status is hereby claimed.

b. ☒ A check in the amount of $ 860.00 to cover the above fees is enclosed.

c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Stephen W. Palan
NAME

43,420
REGISTRATION NUMBER

(01/01)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
)
Leslie GRAF et al.) Group Art Unit: UNASSIGNED
)
Application No.: UNASSIGNED) Examiner: UNASSIGNED
)
Filed: May 9, 2001)
)
For: SECURITY IN TELECOMMUNICATIONS)
NETWORK GATEWAYS)
)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please replace claims 3-8 as follows.

3. (Amended) A method according to claim 1, wherein the telecommunication network comprises a Signalling System No. 7 (SS7) based signalling network which is interfaced to the ISP via the signalling gateway.

4. (Amended) A method according to claim 3, wherein the network coupling the signalling gateway to the ISP is an IP based network.

5. (Amended) A method according to claim 4, wherein the signalling gateway provides a conversion between at least the Message Transfer Part protocols of the SS7 network and the IP based protocols enabling ISUP messages to be transferred, transparently, between the exchange and the ISP.

6. (Amended) A method according to claim 4, wherein the ISP from which a signalling message originates is identified at the signalling gateway by virtue of the source IP address associated with the IP datagram in which the message is delivered to the gateway.

7. (Amended) A method according to claim 4, wherein each of the ISPs connected to a given signalling gateway is allocated a unique Point Code in the signalling network of the telecommunications network, Point Codes being included in the header of a signalling message to indicate the destination and source of the message, and the signalling gateway screens messages received from an ISP to confirm that the source Point Codes contained therein correspond to the actual ISPs from which they originated.

8. (Amended) A method according to claim 4, wherein the ISP from which a signalling message originates is identified by virtue of the input port/device of the signalling gateway at which the message arrives.

REMARKS

The Examiner's attention is drawn to the amendments to the application made in the Preliminary Examination Report, and for the convenience of the Examiner the following items are submitted with this application.

A)   International PCT Publication
B)   Preliminary Examination Report
C)   PCT Demand
D)   PCT Request

The above changes to the claims have been made to delete multiple dependency of the claims, to round out the scope of patent protection being sought, and generally to place the claims in better condition for examination on the merits. These changes have been made in accordance with 37 C.F.R. § 1.121 as amended on November 7, 2000.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: _____
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Date: May 9, 2001

<u>Attachment to Preliminary Amendment dated May 9, 2001</u>

Marked-up claims 3-8

3. (Amended A method according to claim 1 [or 2], wherein the telecommunication network comprises a Signalling System No. 7 (SS7) based signalling network which is interfaced to the ISP via the signalling gateway.

4. (Amended) A method according to <u>claim 3</u>, [any one of the preceding claims] wherein the network coupling the signalling gateway to the ISP is an IP based network.

5. (Amended) A method according to claim 4, [when appended to claim 3] wherein the signalling gateway provides a conversion between at least the Message Transfer Part protocols of the SS7 network and the IP based protocols enabling ISUP messages to be transferred, transparently, between the exchange and the ISP.

6. (Amended) A method according to claim 4, [or 5] wherein the ISP from which a signalling message originates is identified at the signalling gateway by virtue of the source IP address associated with the IP datagram in which the message is delivered to the gateway.

7. (Amended) A method according to claim <u>4</u>, [3 or to anyone of claims 4 to 6 when appended to claim 3] wherein each of the ISPs connected to a given signalling gateway is allocated a unique Point Code in the signalling network of the telecommunications network, Point Codes being included in the header of a signalling message to indicate the destination and source of the message, and the signalling gateway screens messages received from an ISP to confirm that the source Point Codes contained therein correspond to the actual ISPs from which they originated.

8. (Amended) A method according to claim <u>4</u>, [3 or to any one of claims 4 to 6 when appended to claim 3] wherein the ISP from which a signalling message originates is identified by virtue of the input port/device of the signalling gateway at which the message arrives.

2/PRTS

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SECURITY IN TELECOMMUNICATIONS NETWORK GATEWAYS

Field of the Invention

4

The present invention relates to security in telecommunications networks and in particular to a method and apparatus for preventing one Internet Access 8 Provider from interfering with telephone circuits allocated to another Internet Access Provider by a common telecommunications network operator.

12 Background to the Invention

At the present time, in order to access the Internet, a user typically has to make a connection (possibly via a 16 modem) to a local telephone exchange of a telecom operator. The exchange then sets-up a circuit switched connection between the user and an input device of an Internet Service Provider (ISP) identified by a 20 telephone number (B-number) dialled by the user. In some cases, the connection may be routed via one or more intermediate exchanges. In either case, the telephone network treats the connection as it would any normal 24 telephone-to-telephone connection, i.e. it is not aware that the connection serves as an Internet access connection.

28 The European Telecommunications Standards Institute (ETSI) has recently established a project under the acronym TIPHON (Telecommunications and Internet Protocol Harmonisation Over Networks) to support the market for 32 voice communication and related voiceband communication (e.g. facsimile) between users connected to both circuit switched networks and IP based networks. As part of TIPHON, it has been proposed to more closely integrate 36 the ISPs into the telecommunications networks and in particular to provide for the exchange of signalling

information between ISPs and the exchanges of
telecommunications networks, for the purpose of setting
up and managing the circuit switched connections between
4 exchanges and the input devices of the ISPs.

The current TIPHON proposal provides for a signalling
gateway which acts as the interface between the
8 signalling network of the telecom operator and the ISP.
It is expected that the signalling network of the
telecom operator will typically be a Signalling System
No.7 (SS7) network which carries messages of the ISDN
12 User Part (ISUP) protocol, whilst communications between
the signalling gateway and the ISP are expected to be
carried over an IP network. One of the roles of the
signalling gateway is therefore to seamlessly relay ISUP
16 messages from the Time Division Multiple Access (TDMA)
SS7 network to the ISP over the packet switched IP
network, and _vice versa_. The signalling gateway is
generally referred to as an SS7/IP gateway.
20
It is likely that the SS7/IP gateways will be under the
control of the telecom network operator, and that a
single gateway may provide a signalling interface to the
24 telecom network for a plurality of independently
operated ISPs.

Summary of the Present Invention
28
The inventors of the present invention have discovered
that under the current TIPHON proposals it is possible
for an ISP connected to an SS7/IP gateway to interfere
32 with the control of another ISP, and in particular with
circuits allocated to that other ISP, connected to the
same SS7/IP gateway.

It is therefore an object of the present invention to overcome or at least mitigate this problem of fraudulent (or accidental) cross-ISP interference.

This and other objects are achieved by including functionality in the SS7/IP gateway for authenticating signalling messages received from ISPs connected thereto on the basis of the message content and the origins of the messages.

According to a first aspect of the present invention there is provided a method of transferring signalling messages between an Internet Service Provider (ISP) and an exchange of a telecommunications network for the purpose of allocating and controlling circuit switched communication channels between the exchange and the ISP, the method comprising:

routing said signalling messages via a signalling gateway which provides for conversion of messages between a first transmission protocol used in the telecommunications network and a second transmission protocol used in the network which connects the signalling gateway to the ISP; and

for each message received at the signalling gateway from the ISP, confirming the right of that ISP to control a circuit switched communication channel identified in the message.

By authenticating signalling messages received at the signalling gateway from the ISP, the signalling gateway is able to prevent fraudulent messages from being passed from the ISP to the exchange which might otherwise interfere with those circuits allocated by the exchange to another ISP.

Preferably, a record is maintained at the signalling gateway, of the circuit switched communication channels allocated to each ISP coupled to the signalling gateway.

Preferably, the telecommunication network comprises a Signalling System No.7 (SS7) based signalling network which is interfaced to the ISP via the signalling gateway. More preferably, the network coupling the signalling gateway to the ISP is an IP based network, such that the signalling gateway provides a conversion between at least the Message Transfer Part protocols (i.e. said first transmission protocol) of the SS7 network and the IP based protocols. This arrangement allows ISUP messages to be transferred, transparently, between the exchange and the ISP.

In certain embodiments of the invention, the ISP from which a signalling message originates is identified at the signalling gateway by virtue of the source IP address associated with the IP datagram in which the message is delivered to the gateway. Typically, each ISP coupled to the signalling gateway is allocated a unique IP address. The signalling gateway maintains a record of those circuits which are allocated to a given ISP/IP address.

In other embodiments of the invention, each of the ISPs connected to a given signalling gateway is allocated a unique Point Code in the signalling network of the telecommunications network, Point Codes being included in the header of a signalling message to indicate the destination and source of the message. The signalling gateway screens messages received from an ISP to confirm that the source Point Codes contained therein correspond to the actual ISPs from which they originated. Again, the originating ISP for a message may be identified on

the basis of the source IP address of the message
containing datagram.

4   In other embodiments of the invention, the ISP from
which a signalling message originates is identified by
virtue of the input port/device of the signalling
gateway at which the message. Thus input port/device

8   identity may be used as an alternative to the source ISP
IP address.

According to a second aspect of the present invention

12 there is provided apparatus for transferring signalling
messages between an Internet Service Provider (ISP) and
an exchange of a telecommunications network for the
purpose of allocating and controlling circuit switched

16 communication channels between the exchange and the ISP,
the apparatus comprising a signalling gateway coupled
between a signalling network of a telecommunications
network and a network connected to an Internet Service

20 Provider (ISP) and arranged to:
        convert messages between a first transmission
protocol used in the telecommunications network and a
second transmission protocol used in the network which

24 connects the signalling gateway to the ISP; and
        for each message received at the signalling
gateway from the ISP, to confirm the right of that ISP
to control a circuit switched communication channel

28 identified in the message.

Brief Description of the Drawings

32 For a better understanding of the present invention and
in order to show how the same may be carried into effect
reference will now be made, by way of example, to the
accompanying drawings, in which:

6

Figure 1 shows a signalling gateway coupling a signalling network of a telecommunications network to a number of ISPs;

Figure 2 illustrates schematically the protocol stacks implemented at the signalling gateway of Figure 1; and

Figure 3 is a flow diagram illustrating the method of operation of the signalling gateway of the network of Figure 1.

Detailed Description of Certain Embodiments

In Figure 1 there is illustrated a subscriber telephone 1 connected to a local access exchange 2 of a telephone network. This network is assumed to be a conventional network employing PSTN, ISDN, or certain other known communication protocols. Within the network, circuit switched channels over which voice or data may be transmitted are set up and controlled using a Signalling System No.7 based signalling network (e.g. CCITT No.7). More particularly, inter-exchange signalling messages carried by the SS7 network conform to the ISDN User Part (ISUP) protocol.

The present example is concerned with the setting-up and control of a voice communication channel between the telephone network subscriber terminal 1 and a remote terminal (not shown in Figure 1) coupled to the Internet 3. The remote terminal may be for example a multi-media PC connected via a modem and a local access network to the Internet 3, or it may be a telephone network subscriber telephone similar to the telephone 1. In either case, voice data is communicated between the two terminals/telephones over the Internet 3.

A number of ISPs 4 are each allocated a large number of circuit switched channels by the access exchange 2, and

each of these channels has an identification number
(CIC) unique to the exchange 2. In order to access the
Internet, it is necessary to establish a connection over
4   one of the allocated channels between the subscriber
telephone 1 and an Internet interface device 5 (via the
access exchange 2) provided by one of the ISPs 4.

8   The interface device 5 is known in the art as a "Media
Gateway" and is arranged to convert voice information
received from the telephone 1 into a form suitable for
transmission over the Internet (involving for example
12   transcoding, formatting, etc) and to perform the reverse
transformation for data received over the Internet and
destined for the telephone 1. It is noted that the
Media Gateway 5 may communicate with a remote Media
16   Gateway, or with a remote IP terminal, using the ITU
multi-media protocol H.323 although this will not be
considered here in further detail.

20   Each ISP 4 has a "Media Controller" 6 which is analogous
to a conventional telecommunications network switch,
i.e. it is responsible for the general management of
Media Gateway resources and in particular for allocating
24   Media Gateways to subscribers (or rather to circuits
originating at the access exchange 2).

The Media Controller 6 is arranged to exchange
28   signalling information with a signalling gateway 7,
referred to hereinafter as an SS7/IP gateway, which is
under the control of the telecommunications network
operator and can thus be considered secure from the
32   point of view of the operator. The SS7/IP gateway 7 is
connected to the SS7 network and as such is typically
allocated a unique Point Code within the visibility area
of the SS7 network, which Code provides a destination
36   (and source) address for messages within the network.
The physical connection between the Media Controllers 6

and the SS7/IP gateway 7 is provided by an IP network
which may be the Internet but which is more probably an
intranet having no public access.

4

Figure 2 illustrates the communication protocol layers
implemented at the SS7/IP gateway 7 in order to allow
ISUP messages carried by the SS7 signalling network to
8   be relayed over the IP network to the Media Controllers
6, and *vice versa*. ISUP messages received at the SS7/IP
gateway 7 from the access exchange 2 over the SS7
network are processed through a Message Transfer Part
12   (MTP) layer 8 (see "Understanding Telecommunications",
vols. 1 & 2, Studentlitteratur, Lund, Sweden (ISBN 91-
44-00214-9)) before being passed to a processing and
control part 9. Messages are relayed through this part
16   9 before being processed by a TCP/IP part 10 to provide
IP datagrams suitable for transmission over the IP
network to the Media Controllers 6. Messages received
at the SS7/IP gateway 7 over the IP network are
20   processed in the reverse direction, with the processing
and control part 9 performing an additional message
authentication operation as will now be described.

24   For the purpose of routing datagrams over the IP network
between the SS7/gateway 7 and the Media Controllers 6 of
the various ISPs 4, each Media Controller 6 is allocated
an IP address (unique in that IP network). The IP
28   address allocated to a Media Controller 6 is
incorporated into all datagrams sent by that controller
6 to the SS7/IP gateway 7 and enables the SS7/IP gateway
7 to confirm the source of a received packet.

32

When a signalling message is received by the SS7/IP
gateway 7, the processing and control part 9 identifies
the IP address associated with the message. The gateway
36   7 maintains a record of the IP addresses allocated to
the various Media Controllers 6 as well as a record of

the circuits (CICs) allocated to each ISP. Each
signalling message contains in its header part the CIC
to which the message relates. The processing and

4   control part 9 confirms that the originating ISP 4,
identified from the source IP address, is allocated the
CIC to which the signalling message relates. If the
result is positive, the message is passed to the MTP 8

8   for relaying to the access exchange 2. If the result is
negative, i.e. the signalling message relates to a CIC
not allocated to the originating ISP 4, then the message
is not relayed further and is discarded. In this event,

12 an error message may be returned to the originating ISP
4 and also possibly to the access exchange 2.

Figure 3 is a flow chart illustrating the message

16 authentication and relay steps performed at the SS7/IP
gateway 7 upon receipt of a signalling message from an
ISP 4.

20 It will be appreciated that modifications may be made to
the above described embodiment without departing from
the scope of the present invention. For example, each
Media Controller 6 may be allocated a Point Code in the

24 SS7 network of the telecommunications network. Thus, a
Media Controller 6 may be made the destination node for
an SS7 message rather than the SS7/IP gateway (although
signalling messages are still routed through the SS7/IP

28 gateway). As the Point Code is included in the header
of an ISUP message, the SS7/IP gateway 7 may authorise a
received signalling message by matching the Point code
included in the message header with the source IP

32 address.

Whilst the embodiment described above includes only a
single exchange 2 to which the subscriber telephone 1,

36 the SS7/IP gateway 7, and the ISPs 4 are all directly
connected, it will be appreciated that this need not be

the case.   Indeed, a more likely scenario involves a
number of transit exchanges through which signalling
data and circuit switched channels are routed.   It will
4   also be appreciated that the present invention is not
limited to voice communications and is also applicable
to general data communications.

8   The above description has also been concerned with the
use of ISPs to connect subscribers to the Internet.   The
present invention may also be employed in connection
with ISPs which connect subscribers to one or more
12 closed intranets.

11

Claims

1. A method of transferring signalling messages
between an Internet Service Provider (ISP) and an
5 exchange of a telecommunications network for the purpose
of allocating and controlling circuit switched
communication channels between the exchange and the ISP,
the method comprising:
        routing said signalling messages via a signalling
10 gateway which provides for conversion of messages
between a first transmission protocol used in the
telecommunications network and a second transmission
protocol used in the network which connects the
signalling gateway to the ISP; and
15   for each message received at the signalling gateway
from the ISP, confirming the right of that ISP to
control a circuit switched communication channel
identified in the message.

20 2. A method according to claim 1 and comprising
maintaining a record at the signalling gateway of the
circuit switched communication channels allocated to
each ISP coupled to the signalling gateway.

25 3. A method according to claim 1 or 2, wherein the
telecommunication network comprises a Signalling System
No.7 (SS7) based signalling network which is interfaced
to the ISP via the signalling gateway.

30 4. A method according to any one of the preceding
claims, wherein the network coupling the signalling
gateway to the ISP is an IP based network.

5. A method according to claim 4 when appended to
35 claim 3, wherein the signalling gateway provides a
conversion between at least the Message Transfer Part
protocols of the SS7 network and the IP based protocols

12

enabling ISUP messages to be transferred, transparently, between the exchange and the ISP.

6. A method according to claim 4 or 5, wherein the ISP
5   from which a signalling message originates is identified at the signalling gateway by virtue of the source IP address associated with the IP datagram in which the message is delivered to the gateway.

10 7. A method according to claim 3 or to any one of claims 4 to 6 when appended to claim 3, wherein each of the ISPs connected to a given signalling gateway is allocated a unique Point Code in the signalling network of the telecommunications network, Point Codes being
15 included in the header of a signalling message to indicate the destination and source of the message, and the signalling gateway screens messages received from an ISP to confirm that the source Point Codes contained therein correspond to the actual ISPs from which they
20 originated.

8. A method according to claim 3 or to any one of claims 4 to 6 when appended to claim 3, wherein the ISP from which a signalling message originates is identified
25 by virtue of the input port/device of the signalling gateway at which the message arrives.

9. Apparatus for transferring signalling messages between an Internet Service Provider (ISP) and an
30 exchange of a telecommunications network for the purpose of allocating and controlling circuit switched communication channels between the exchange and the ISP, the apparatus comprising a signalling gateway coupled between a signalling network of a telecommunications
35 network and a network connected to an Internet Service Provider (ISP) and arranged to:

convert messages between a first transmission protocol used in the telecommunications network and a second transmission protocol used in the network which connects the signalling gateway to the ISP; and

for each message received at the signalling gateway from the ISP, to confirm the right of that ISP to control a circuit switched communication channel identified in the message.
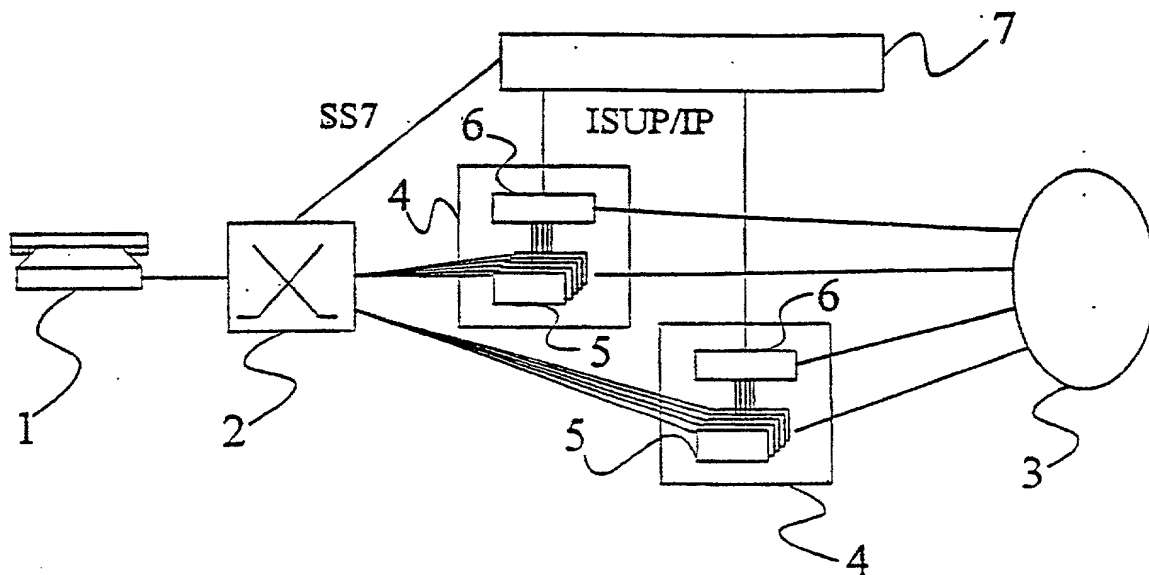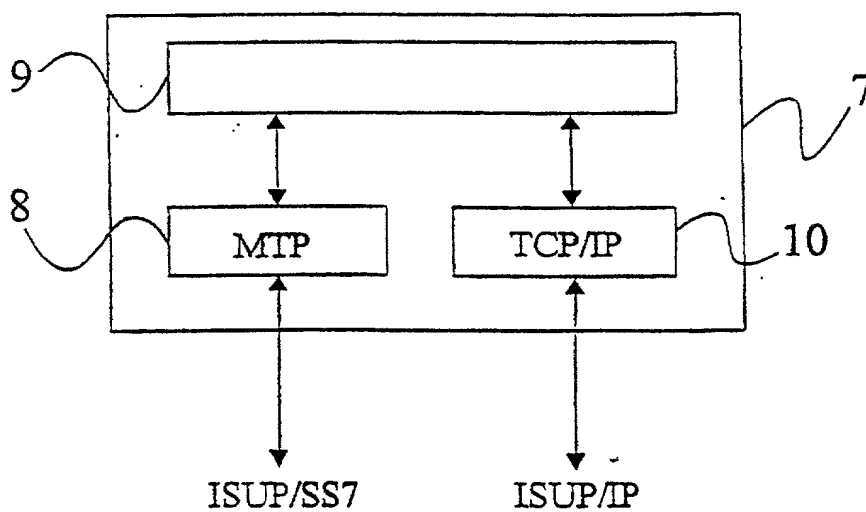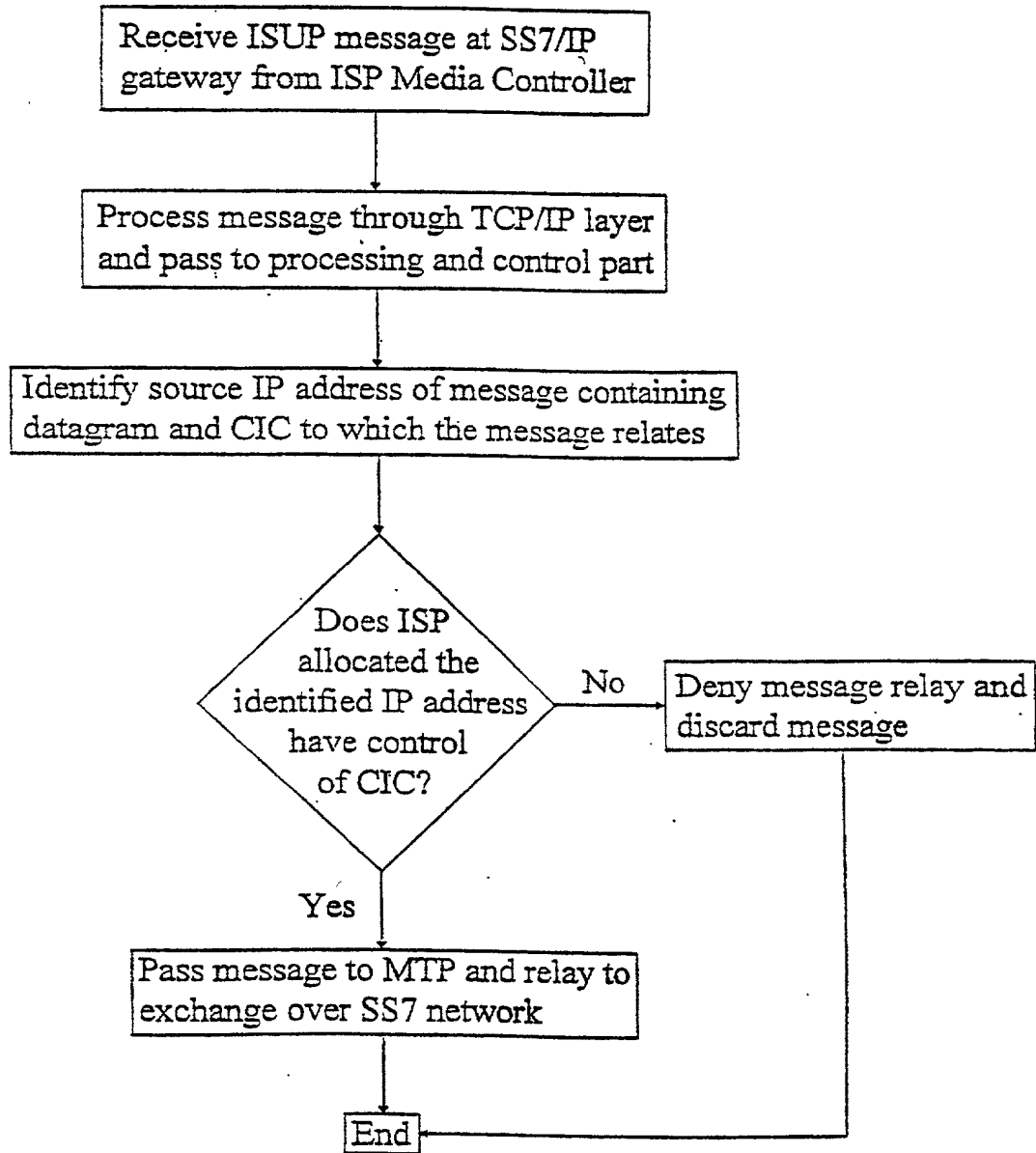
SS7

ISUP/IP

7

6

4

6

5

5

4

1

2

3

Figure 1

9

7

8

MTP

TCP/IP

10

ISUP/SS7

ISUP/IP

Figure 2

09/831281

Receive ISUP message at SS7/IP
gateway from ISP Media Controller

↓

Process message through TCP/IP layer
and pass to processing and control part

↓

Identify source IP address of message containing
datagram and CIC to which the message relates

↓

Does ISP
allocated the
identified IP address   No   Deny message relay and
have control   discard message
of CIC?

Yes ↓   ↓

Pass message to MTP and relay to
exchange over SS7 network

↓

End

Figure 3

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to Provisional and PCT International Applications)	Attorney's Docket No.
	027566-028

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SECURITY IN TELECOMMUNICATIONS NETWORK GATEWAYS

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Number _____

on _____

and was amended

on _____ (if applicable).

☒ was filed as PCT international application

Number __PCT/EP99/08591_____

on __9 November 1999_____

and was amended

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(e) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119
Finland	982443	10 November 1998	X Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

_____   _____
(Application Number)   (Filing Date)

_____   _____
(Application Number)   (Filing Date)

(01/01)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States applications(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations §1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. §120:

U.S. APPLICATIONS		STATUS (check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NUMBERS ASSIGNED (if any)		

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

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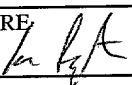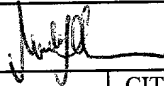P.O. Box 1404
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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